Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A phase mask~~,~~ for forming a diffraction grating in an object for an optical medium~~, including a photosensitive part~~ by exposing the object to UV light containing diffracted light rays to cause ~~the~~ a refractive index of ~~the~~ a photosensitive part of the object to change by interference fringes produced by interference of diffracted light rays of different orders of diffraction, ~~said~~ the phase mask comprising:

a transparent substrate having ~~one~~ a surface provided with a pattern of a plurality of grooves;

wherein:

~~the pattern~~ each of the grooves has a duty ratio ~~adjusted according~~ dependent on a position of the respective groove on the substrate;

the duty ratios for the grooves are selected ~~to the positions of the grooves~~ so that the phase mask can be used to perform an apodization exposure of the object ~~can be achieved~~ when the object is exposed to the UV light through the phase mask; and

the plurality of grooves are arranged on the substrate in a single pitch, the duty ratios being determined by varied widths of the grooves.

2. (Cancelled)

3. (Currently Amended) A phase mask~~,~~ for forming a diffraction grating in an object for an optical medium~~, including a photosensitive part~~ by exposing the object to UV light containing diffracted light rays to cause ~~the~~ a refractive index of ~~the~~ a photosensitive part of the object to change by interference fringes produced by interference of diffracted light rays of different orders of diffraction, ~~said~~ the phase mask comprising:

a transparent substrate having one surface provided with a pattern of a plurality of grooves;

wherein:

the plurality of grooves are arranged on the substrate in a single pitch;

each ~~the respective depths~~ of the grooves has a depth dependent on a position ~~are adjusted according to the positions~~ of the ~~grooves~~ respective groove on the substrate; and

the depths of the grooves are selected so that the phase mask can be used to perform an apodization exposure of the object ~~can be achieved~~ when the object is exposed to the UV light through the phase mask.

4. (Currently Amended) The phase mask~~, for forming a diffraction grating,~~ according to claim 1, wherein the phase mask is ~~characterized in~~ configured so that the phase mask can be used to ~~forming~~ form a diffraction grating in the object having a discontinuously changing period.

5. (Currently Amended) The phase mask~~, for forming a diffraction grating,~~ according to claim 1, wherein ~~the object is used for forming~~ the phase mask is configured so that the phase mask can be used to form a diffraction grating in an object used to form an optical waveguide.

6. (Original) The phase mask~~, for forming a diffraction grating,~~ according to claim 5, wherein ~~the object is used for forming~~ the phase mask is configured so that the phase mask can be used to form a diffraction grating in an object used to form an optical fiber.

7. (Currently Amended) A ~~phase mask fabricating~~ method of fabricating a phase mask~~,~~ including a transparent substrate having a surface provided with a pattern of a plurality of grooves for forming a diffraction grating in an object for an optical medium~~, including a photosensitive part~~ by exposing the object to UV light containing diffracted light rays to cause ~~the~~ a refractive index of ~~the~~ a photosensitive part of the object to change by interference

fringes produced by interference of diffracted light rays of different orders of diffraction, ~~comprising a transparent substrate having one surface provided with a pattern of a plurality of grooves, said phase mask fabricating~~ the method comprising ~~the steps of~~:

preparing a transparent substrate; and

processing the transparent substrate to form the pattern of grooves by a photolithographic process including an exposure step ~~for forming grooves~~, a pattern development step and an etching step;

wherein:

the exposure step is performed so that ~~for forming the grooves is changed during the photolithographic process such that the pattern of the grooves has a duty ratio adjusted according to the positions of the grooves so that apodization exposure can be achieved when the object is exposed to UV light through the phase mask~~each of the grooves has a duty ratio dependent on a position of the respective groove on the substrate;

the duty ratios for the grooves are selected so that the phase mask can be used to perform an apodization exposure of the object when the object is exposed to the UV light through the phase mask; and

the plurality of grooves are formed on the substrate in a single pitch, the duty ratios being determined by varying widths of the grooves.

8. (Currently Amended) The ~~phase mask fabricating~~ method according to claim 7, wherein the ~~photolithographic process adjusts the~~ exposure step comprises ~~by~~ performing a multiple exposure method ~~in forming~~ to form the grooves having duty ratios dependent on the positions of the grooves.

9. (Currently Amended) A ~~phase mask fabricating~~ method of fabricating a phase mask including a transparent substrate having a surface provided with a pattern of a plurality of grooves~~,~~ for forming a diffraction grating in an object for an optical medium~~, including a~~

~~photosensitive part~~ by exposing the object to UV light containing diffracted light rays to cause ~~the~~ a refractive index of ~~the~~ a photosensitive part of the object to change by interference fringes produced by interference of diffracted light rays of different orders of diffraction, ~~comprising a transparent substrate having one surface provided with a pattern of a plurality of grooves, said~~ the ~~phase mask fabricating~~ method comprising ~~the steps of~~:

preparing a transparent substrate; and

processing the transparent substrate to form the pattern of grooves by a photolithographic process including an exposure step ~~for forming grooves~~, a pattern development step and an etching step;

wherein:

the plurality of grooves are formed on the substrate in a single pitch;

each of the grooves is formed to a depth dependent on a position of the respective groove on the substrate by repeating the photolithographic process as necessary to obtain the respective depth; and

~~the number of times of the photolithographic process in order to adjust the respective~~ depths of the grooves ~~according to the positions of the grooves~~ are selected so that the phase mask can be used to perform an apodization exposure ~~can be achieved~~ of the object when the object is exposed to the UV light through the phase mask.

10. (Currently Amended) The ~~phase mask fabricating~~ method according to claim 7, wherein the exposure step in the photolithographic process is ~~carried out by~~ performed using an electron lithography system or a laser lithography system.

11. (Currently Amended) The ~~phase mask fabricating~~ method according to claim 7, wherein ~~the object is used for forming~~ the phase mask is formed in a configuration that permits the phase mask to be used to form a diffraction grating in an object used to form an optical guide.

12. (Currently Amended) The ~~phase mask fabricating~~ method according to claim 11, wherein ~~the object is used for forming~~ the phase mask is formed in a configuration that permits the phase mask to be used to form a diffraction grating in an object used to form an optical fiber.

13. (Withdrawn) A diffraction grating forming method using a phase mask comprising a transparent substrate having one surface provided with a pattern of a plurality of grooves having a duty ratio adjusted according to the positions of the grooves so that apodization exposure can be achieved when an object for an optical medium, having a photosensitive part is exposed to UV light through the phase mask, said diffraction grating forming method comprising the steps of:

exposing the object to UV light containing diffracted light rays diffracted by the phase mask; and

forming a diffraction grating in the object by causing the refractive index of the photosensitive part of the object to change by interference fringes produced by interference of the diffracted light rays of different orders of diffraction.

14. (Withdrawn) A diffraction grating forming method using a phase mask having a transparent substrate having one surface provided with a pattern of a plurality of grooves respectively having depths adjusted according to the positions of the grooves so that apodization exposure can be achieved when an object for an optical medium, having a photosensitive part is exposed to the UV light through the phase mask, said diffraction grating forming method comprising the steps of:

exposing the object to UV light containing diffracted light rays diffracted by the phase mask; and

forming a diffraction grating in the object by causing the refractive index of the photosensitive part of the object to change by interference fringes produced by interference of the diffracted light rays of different orders of diffraction.